

REMARKS

Applicant respectfully requests that the Examiner exercise his discretion to enter this amendment, especially in light of the following comments. Moreover, Applicant believes that the Examiner may have inadvertently misconstrued the teachings of the Smith reference and therefore urges the Examiner to take a second look at the reference and to reconsider his initial opinion. Applicant has also added new claims 21, 22 and 23, but these claims do not add new matter and are merely slightly amended versions of original claims 19 and 20. For the reasons set forth below, Applicant believes this application is now in condition for allowance and respectfully requests notice of same.

The Examiner has indicated that Applicant's "basic argument" is that the combination of Hatch and Smith are nonanalogous art. Although Applicant believes that it is improper to combine Smith with Hatch, this was not Applicant's main argument. The more important argument was that a *prima facie* case of obviousness can not be maintained because the two cited references simply do not teach all of the claimed elements of Applicant's invention. This was clearly set forth in Applicant's last response. Below is a summary of the claimed elements that are *missing* even if it is assumed that the combination of the references is proper:

- 1) that the *plied* composite has less twist than at least the one spun yarn.
(claims 1-23)
- 2) that the at least one spun yarn has a single twist of at least 4 turns per inch more than the level of twist imparted in the opposite direction to the plied composite. (claims 1-23)
- 3) that the at least one spun yarn has a single twist of at least 6 turns per inch more than the twist imparted in the opposite direction to the plied composite. (claim 2)
- 4) that the at least one spun yarn has a single twist of 17 turns per inch and the plied composite has no more than 13 turns per inch in the opposite

direction. (new claim 21)

- 5) that the at least one spun yarn has a single twist in the range of 17 to 20 turns per inch and the plied composite has no more than 13 turns per inch in the opposite direction. (new claim 22)
- 6) that the sewing thread comprises two spun yarns, each having a single twist in the range of 17 to 20 turns per inch and the plied composite has no more than 13 turns per inch in the opposite direction. (new claim 23)

Although Hatch teaches that the individual yarns that are eventually plied together are twisted, both the Applicant and Examiner agree that Hatch does *not* mention any level or degree of twist of these individual yarns and, more importantly, does *not* mention any level of twist of the plied composite. Moreover, it appears that the Examiner apparently overlooked the fact that Hatch actually teaches that a plied composite of individual twisted yarns should be “*balanced*.”

Balanced twist in the plied and cabled yarn ‘is the arrangement of twist which will not cause twisting on itself when the yarn or cord is held in the form of an open loop.’

(see Hatch pg. 294, col. 1, 4th para.) Thus, Hatch teaches that there should be no significant difference between the tpi of individual yarns and the tpi in the opposite direction of the plied composite. Indeed, Hatch teaches the exact opposite of what Applicant is claiming. Each of Applicant’s claims requires that the at least one spun yarn has a greater twist than the plied composite. This is not the “balanced” twist that is taught by Hatch.

The secondary reference, Smith, does *not* supply what is missing from Hatch. Indeed, just the opposite. Smith is completely consistent with Hatch in teaching that the level of twist of the plied composite should be “twisted together at the same number of turns per inch” in the opposite direction.

[0029] FIG. 2B shows an enlarged perspective view of a different embodiment of one strand 7 in the inner layer, and shows one of the pre-twisted substrands 19 in greater detail. In FIG. 2B, strand 7 is constructed from three pre-twisted substrands 19. Each substrand 19 is formed as follows. Three yarns 20 are individually formed from a multiplicity of continuous filaments 21. Each yarn 20 is twisted about its longitudinal axis at between 1 and 6 turns per inch (tpi), and preferably between 2 and 4 tpi, in a counterclockwise direction (denoted by the smaller arrow). **The three twisted yarns 20 are then twisted together at the same number of turns per inch in a clockwise direction (denoted by the larger arrow).** Alternatively, substrands 19 can be formed in a single twisting step by twisting together all yarns in the substrand in a clockwise direction at between 1 and 6 tpi, and preferably between 2 and 4 tpi. The amount of turns per inch in the twisting will vary proportionately smaller or larger depending on the diameter of the particular yarns, substrands, and strands being constructed. In the lower portion of FIG. 2B, the three substrands 19 are shown in cylindrical outline (for example, as more clearly shown in FIG. 2A). However, all three substrands in this embodiment are formed in the same manner, that is, by the twisting of multifilament yarns, and there is no sheathing of any of the substrands 19.

(see Smith, para. 29). The Examiner has indicated that Smith teaches a twist greater than 4 tpi, up to 6 tpi. This teaching, however, does not support the Examiner's contention that Smith supplies the missing element absent in Hatch, that being that the composite or plied structure *must* have a twist of 4 tpi or less than the individual at least one spun yarn. While it is absolutely true that Smith teaches that individual yarns that make up the composite should have a level of twist between 1 and 6 tpi, Smith says absolutely nothing about having the composite twisted *less* than the individual yarns making up the composite. Or, stated differently, Smith is completely silent that the individual yarns making the composite can have higher levels of twist than the composite.

Each and every claim of Applicant's invention requires that the composite have a level of twist at 4 tpi or *less* than the at least one spun yarn. Smith, like Hatch, teaches the exact

opposite. As clearly stated in paragraph 29 of Smith, reproduced above, the 1 to 6 tpi level of twist is *only* directed to the individual yarns **20** in the “counterclockwise” direction. “The three twisted yarns **20** are then twisted together *at the same number of turns per inch in a clockwise direction.*” (see Smith para. 29) Thus, Smith teaches that the composite should have the same number of tpi as the individual yarns, not less. Like Hatch this necessarily results in a balanced twist of the composite. Smith also does not come close to teaching a level of twist of at least 17 tpi as required by new claims 21-23. For these reasons alone Applicant submits that the combination of Hatch and Smith do not teach each and every element of the claimed invention and thus a *prima facie* case of obviousness has *not* been established. As such, Applicant respectfully requests this rejection be withdrawn.

The Examiner has also stated that Applicant has not shown unexpected results. Applicant respectfully disagrees. The bar graph on page 13 of the originally filed patent specification clearly shows unexpected results. This graph clearly illustrates that sewing performance for a sewing thread made from highly twisted spun yarn singles (Samples C & D) perform equally to commercially available sewing thread made from continuous filament yarns (Perma Core). And, sewing thread made according to the claims of the invention out perform commercially available sewing thread made with low twist spun yarn (Perma Spun). Perma Spun sewing thread is used as the basis of comparison to the claimed inventions and comprises 3 strands of spun yarn containing 100% stable fibers, with each individual yarn twisted 13.5 tpi in the S direction and having the plied composite twisted 10.74 tpi in the Z direction. Thus, the individual strands have only about 3 tpi greater twist than the composite. The bar graph clearly demonstrates unexpected results for sewing thread samples A, B, C and D, which had levels of twist of the individual yarns that were 5, 6, 7 and 8 tpi, respectively, *greater* than the plied composites, which was twisted 12

tpi. The sewing performance of the claimed sewing threads exceeded the Perma Spun and increased until a single twist level of 21 tpi was reached (Sample E). At 19 and 20 tpi (Samples C and D) the high twist spun yarn sewing thread of the present invention matched the sewing performance of Perma Core sewing thread made using a continuous filament core yarn (i.e., non-staple fibers). Therefore, it is possible to match the performance of the a continuous filament yarn using spun yarns if the the level of twisted is manipulated according to the Applicant's invention. This is clearly an unexpected result.

Applicant also maintains its secondary argument that one skilled in the art developing and manufacturing *sewing thread* would not look to a reference directed to *elevator rope*. First, the Smith reference is completely silent with regard to sewing thread and yarns made with 100% staple fibers. In fact, Smith only teaches the use of synthetic continuous filament yarns and does not mention using yarns composed of 100% staple fibers. (See Smith, para. 11). Each of Applicant's claims requires at least one spun yarn comprising 100% staple fibers. In addition, Smith teaches a maximum twist level of only 6 tpi whereas claims 21-23 of Applicant's invention require at least 17 tpi. Thus, the combination of Smith with Hatch is improper and provides an independent basis why the rejection should be withdrawn.

For the above stated reasons Applicant requests that all outstanding rejections be withdrawn and that a Notice of Allowance for claims 1-3, 7-14, and 21-23 be entered. If the Examiner has any questions, please call the undersigned directly at 312/913-2143.

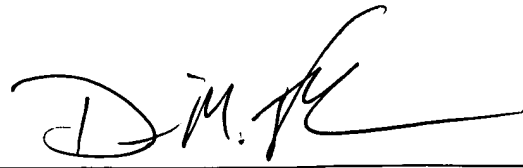
Respectfully submitted,

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5/23/06

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